APPLICATION

OF

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ON

METHOD AND SYSTEM FOR KITTING SMART CARDS WITH A SHRINK WRAP LICENSE

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METHOD AND SYSTEM FOR KITTING SMART CARDS WITH A SHRINK WRAP LICENSE

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to the "kitting" of Smart Cards and more specifically to a method of and equipment for packaging the Smart Cards with a film that is preprinted with the licensing agreement.

Description of the Related Art

Smart Cards are being used as a means for securely storing and communicating large amounts of personalized data in essentially a credit card. Smart Cards are being used for bank and credit services, medical history, transportation, and as access cards to enable secured devices or networks. A smart card is embedded with a module that contains an integrated circuit chip. The module is configured to interface with some type of a card reader. A "non-contact" card interfaces using, for example, IR. A "contact" card includes contact pads that would mate with pins on the card reader. The Smart Cards are relatively expensive and fragile. The IC chip and module are sensitive to bending, scratching and static electricity. The replacement cost due to damage caused during packaging and distribution is high.

In many of the applications contemplated for Smart Cards, it is desirable to package the Smart Card with some form of a Licensing Agreement, typically known as a "shrink wrap license". By opening the package and using the Smart Card, the user accepts the terms of the license, which may include terms of use, payment terms, limitation on liability, acknowledgement of intellectual property rights,

etc. To be valid the licenses should be prominent, readable, complete and clearly associated with the acceptance and use of the Smart Card.

One way of packaging individual Smart Cards with a shrink wrap license agreement is to print the licensing agreement on the front of a standard #10 envelope, attach the Smart Card to a carrier of approximately the same size as the envelope and seal the Smart Card inside the envelope. In the case of a DirecTV access card, the back of the envelope is provided with a window so that a bar code on the card may be read during handling and distribution without opening the envelop. These envelopes are typically sent in bulk to distributors, OEMs, etc. that incorporate them into other products and services and then distribute them to customers. For daily mailings direct to the customer, either the printed envelop can be placed into, for example, a larger FedEx envelope or the licensing agreement can be printed on the carrier and tape that hold the card and packaged into a #10 envelope using an industry standard mailing machine.

A #10 envelop is much larger than a typical Smart Card and thus more difficult and expensive to store and transport in large volumes. This size of envelop is used for two reasons. First, the envelopes and the equipment for "kitting" the Smart Card into the envelope is standard equipment for vendors. Second, a typical licensing agreement in a readable font size will not fit on the front of card sized envelopes.

By way of example, DIRECTV® provides access cards that are encoded with certain identification, service and security information for use with their integrated receiver decoder (IRD) set-top boxes and digital video recorders (DVRs) to provide secure satellite television services. DIRECTV requires that every Smart Card it distributes to

IRD manufacturers and dealers be accompanied by a licensing agreement to provide protection for the proprietary and sensitive materials incorporated into the software in the Smart Card. The access cards are expensive, fragile and produced in the tens to hundreds of thousands for typical applications and even into the millions for DIRECTV access cards.

Currently, DIRECTV sends crates full of access cards to an outside vendor for kitting. The vendor mounts each card on an insert and seals it into a #10 envelope with a preprinted licensing agreement on the front. A window on the back of the envelope provides access to read the bar code on the access card. The vendor then recrates the sleeves of 500 and returns them to DIRECTV where they are stored in a large warehouse. Kitted Smart Cards in sleeves are placed in a shipping crate with many other boxes/sleeves and shipped to an IRD/DVR OEM. The OEM reads the bar code of the access card and marries it to a particular IRD/DVR and keeps them in stock. The OEM will then distribute the IRD/DVR with its unique access card to retailers or professional installers. Eventually, the system is installed in a customer's home at which time the user breaks the seal on the envelope to insert the card into the IRD/DVR to activate the system. The act of breaking the seal signifies the user's acceptance of the licensing agreement.

There is a large and growing need in the industry to find a more cost effective technique for "kitting" smart cards with a shrink wrap license that minimizes damage to the cards and reduces the cost of storing and transporting the cards.

SUMMARY OF THE INVENTION

The present invention provides a space efficient and

less expensive method and system for kitting the Smart Cards with a shrink wrap license agreement.

This is accomplished by preprinting a film with the licensing agreement, wrapping the film around the Smart Card and sealing the package. The film can be formed of any suitable material that can be legibly printed and efficiently wrapped and sealed. For example, paper, plastic or a polypropylene/polyethylene composition. The package may be sealed with tape or with the application of heat.

To use the Smart Card the customer must break the seal thereby accepting the terms and conditions of licensing agreement. To ensure that the license is sufficiently prominent and legible, the footprint of the printed text will typically be both wider and longer than the footprint of the card. To accommodate this feature of the license, the package may be made wider than the card and the text allowed to wrap around the card front-to-back. The film may be provided with a window of clear film in the text of the license agreement that is aligned to a bar code on the Smart Card to facilitate reading of the bar code.

In an exemplary embodiment, specialized equipment is used to package a large number of Smart Cards cost effectively to avoid bending, scratching, mechanically damaging the card, to reduce static problems and to properly align the license agreement to the Card. The assembly line includes at least one card feeder for holding a number of Smart Cards. A feeder mechanism feeds the Smart Cards onto the conveyor belt with minimum contact with the module. This is done by routing out the roller on the feeder mechanism so the card passes onto the conveyer belt without the module being touched. The rollers grip the plastic surrounding the module rather then the area where the module sets within the card body. At least one spool of film feeds a preprinted polypropylene/polyethylene film

with the Smart Cards to a wrapping stage that aligns and wraps the film around the Smart Card to form a spine. A sealing stage seals and cuts film at either end of the spine to produce a kitted Smart Card. To avoid interruption of the line, a second card feeder and a second spool are typically provided. To reduce static, the film may be passed over an anti-static bar prior to wrapping.

These and other features and advantages of the invention will be apparent to those skilled in the art from the following detailed description of preferred embodiments, taken together with the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view of a piece of film preprinted with a shrink wrap license;

FIGs. 2a through 2d are front, back, end and side views of a kitted Smart Card;

FIGs. 3a through 3c illustrate a method of kitting Smart Cards by wrapping and sealing them with the film;

FIGs. 4a and 4b are side and plan views of an embodiment of a kitting machine; and

FIGs. 5a and 5b are detailed side and back views of the card feeder.

DETAILED DESCRIPTION OF THE INVENTION

The current technique provides a space efficient and less expensive method and system for kitting the Smart Cards with a shrink wrap license agreement. To use the Smart Card the customer must break the seal thereby accepting the terms and conditions of licensing agreement. The technique reduces damage to the Smart Cards caused by bending, scratching, static electricity and physically contacting the module, hence reduces replacements costs.

The kitted Smart Card is much smaller and thus easier and cheaper to store and transport. These advantages are considerable when viewed in the context of kitting, storing and transporting hundreds of thousands to millions of Smart Cards for single applications such as DIRECTV access cards, American Express Blue Cards, medical history cards, etc.

As shown in figure 1, a shrink wrap license agreement **10**, suitably the same license that was printed on the #10 envelope, is printed onto a piece of film **12**, suitably 126mm x 174mm to wrap around a card. The film typically includes "fold" alignment markers **14** and "cut" alignment markers **15** that will be used in volume production to align the license to a card. As this particular film is printed with a license for a DIRECTV Access Card it includes a clear window **16** that will be aligned to a bar code on the Smart Card during kitting. This allows the bar code to be read during handling without having to break the seal on the license. A header **17** including the service provider logo and product label is suitably printed above the window.

The "film" should be formed from a material that can be legibly printed with text, made thin enough to be wrapped around a card, durable enough to avoid damage to either the license agreement or the Smart Card and capable of being sealed. Suitable materials might include papers, plastics or other composite materials. In one embodiment, the film is a 0.50 to 1.75 mil thick plastic (polypropylene/polyethylene composition) that is white with black text. The film may be coated with a substance either liquid or some type of layer to reduce static electricity. The license must be printed with a font size that is large enough to be prominent and legible to a user, typically at least 6.5 point. As such a typical license **10** will define a footprint **18** that is considerably larger than the

dimensions of the card. A standard credit card sized Smart Card is 54 mm x 85.6mm (Avg. per ISO 7810). The text footprint **18** is, for example, 117 mm x 174mm.

As shown in figures 2a through 2d, a kitted Smart Card **20** includes a Smart Card **22** that is wrapped and sealed (not typically air tight) inside a package **23** formed by the film **12**. Smart Card **22** includes an embedded module **24** containing an integrated circuit (IC) chip that contains information of some type, e.g. banking, credit, medical, network service and access, etc. For many applications, the Smart Card is also provided with a bar code **26**, typically to allow identification of each unique Card. The Smart Card **22** is by convention but not necessarily the size of a standard credit card. The kitted Smart Card is approximately 1/3 the size of a standard No. 10 envelope. This greatly simplifies the task of handling, storing and transporting large volumes of Smart Cards.

To display the text **28** of licensing agreement **10** legibly and prominently, the text **28** suitably wraps around Smart Card **22** from front-to-back and the footprint of package **23** is oversized, primarily left-to-right but potentially top-to-bottom as well. For a standard credit card sized Smart Card, the package is at least 55mm x 87 mm, at most 85 mm x 145 mm and typically about 67mm x 126mm. Packaging dimensions are determined by the size of the given text to be printed on the film used in the Kitting process. Bar code **26** is readable through window **16**. If packaged in this manner, the Smart Card **22** can move around inside package **23**. If Smart Cards with a larger footprint and/or licensing agreements with a smaller footprint are used the package may be snug around the card. To use the Smart Card the customer must "break the seal" thereby accepting the terms and conditions of licensing agreement.

In the particular embodiment shown in Figure 1, licensing agreement **10** is laid out in a certain format on film **12**; header **17** at the top, window **16** below the header, and the text **28** below the window. Film **12** is then aligned to Smart Card **22** using fold markers **14** so that the text **28** starts at one edge **30** on the front of the Card (Figure 2a) and wraps around front-to-back to a spine **32** (formed by wrapping and sealing the film) on the back of the Card (Figures 2b and 2c). The header **17**, e.g. the DIRECTV logo and "DIRECTV ACCESS CARD", is printed on spine **32** (Figure 2d). The spine **32** will typically fold down as shown in Figure 2b and cover a small portion of the text **28** at the end of the licensing agreement. The film is heated and cut to form a seal **34** at each end of package **23**.

As shown in Figures 3a through 3c, the basic process for "kitting" a Smart Card **22** includes the steps of aligning the film **12** to the Card **22**, wrapping the film around the Card to form spine **32** and sealing & cutting the film to form package **23**. As shown in Figure 3a, film **12** is laid over the front of the Smart Card and aligned so that the top of licensing agreement text "LICENSE AGREEMENT" is aligned to edge **30**. As shown in Figure 3b, film **12** has been wrapped along a long axis of the Smart Card so that the fold markers **14** are joined at the back of the card to form spine **32**, which is suitably heat sealed. As shown in Figure 3c, the film **12** between successive Cards has been heated to form seals **34**. The film is then cut at cut markers **15** to provide the individually packaged Smart Cards with a shrink wrap license.

To kit tens of thousands up to millions of Smart Cards for a given application the kitting process must be automated. The equipment used in the assembly line must be designed to handle the Smart Cards without bending or

scratching the card, contacting the module or exposing it to static electricity. Furthermore, the assembly process must properly align the text of the license agreement and perhaps a window to the Smart Card. For certain applications, the Smart Cards must be kept in a defined order to track the cards.

As shown in figures 4 and 5, an assembly line **40** for kitting Smart Cards includes at least one card feeder **42** for holding a stack of Smart Cards **22** and feeding the Smart Cards onto a first conveyor belt **44**. As best shown in figures 5a and 5b, card feeder **42** includes a removable cartridge **46** for holding a stack of Smart Cards **22**. A roller **48** having a recessed region **50** grips the Card **22** on either side of module **24** and pulls the Card onto conveyor belt **44** where it is placed "module down" between markers **52** on the belt. This avoids contact with, hence damage to the module **24**. Brushes **53** keep the Cards from flying off the line.

As shown in figures 4a and 4b, at least one spool **54** mounted on a housing **55** feeds the film **12** that has been printed with many instances of the licensing agreement **10** through a system of rollers **56** to a wrapping stage **60**. The wrapping stage takes the Smart Cards from the conveyor belt, aligns the licensing agreement **10** and wraps the film around the Smart Card to form spine **32**. Wrapping stage **60** includes a first stage **60a** that brings the edges together forming the bottom edge or spine, a second stage **60b** that heats the edges of the spine and a third stage **60c** that completes the seal for the spine portion of the kit.

A secondary sealing stage **62** seals and cuts the wrapped film ends to produce a kitted Smart Card. All Smart cards are kitted sequentially. The sealing stage **62** suitably includes jaws **64** for holding the card and cutting

the foil and a heating mechanism **65** for heat sealing the film. Alternately, a tape dispenser could be used seal the film.

To avoid interruption of the line, a second card feeder **66** and a second spool **68** are typically provided. To reduce static, the film is passed over an anti-static bar **70** prior to wrapping. To maintain alignment and detect any problems in the line, a number of sensors are placed along the line to detect such parameters as pressure, heat, speed, and alignment of the cards **22**, relative position of the markers **14** and **15** on the film to the cards, and the alignment and temperature of the jaws **64**. For example, sensors **72a** at the card feeder determine whether the Smart Card is lying flat on the conveyor belt between markers **52**. Sensors **72b** at the end of conveyor belt **44** determine whether the film is present. Sensors **72c** at the output of wrapping stage **60** determine whether the spine **32** has been formed. Sensors **72d** in the cutting stage **62** determine whether the package is unobstructed by the Smart Card at cut markers **15**. A computer **74** monitors the sensor data and adjusts such variables as how fast cards are fed onto the belt, the speed of the belt, feeding of the film and temperature of the heating mechanism.

In some applications such as the DIRECTV Access Cards it is important to maintain or know the order that the cards are fed onto the conveyor belt and output from the assembly. If the card includes a bar code, a bar code scanner **76** can be positioned on the line to read the bar code and report back to the computer **74**. Otherwise, the line can be configured so that cards are fed from only one card feeder **42** or **66** at a time to maintain a defined order. The kitted Smart Cards are placed onto a second conveyor belt **78** that moves the kitted Smart Cards away from sealing

stage **62** to a third conveyor belt **80** that delivers the kitted Smart Cards in order to a packaging stage (not shown).

While several illustrative embodiments of the invention have been shown and described, numerous variations and alternate embodiments will occur to those skilled in the art. Such variations and alternate embodiments are contemplated, and can be made without departing from the spirit and scope of the invention as defined in the appended claims.